

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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# MULTIMEDIA UNIVERSITY

## FINAL EXAMINATION

TRIMESTER 3, 2015/2016

**TTP3121 – TCP/IP PROGRAMMING**

(All Sections / Groups)

01 JUNE 2016

9.00 a.m. – 11.00 a.m.

(2 Hours)

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### INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 5 printed pages including cover page with 6 questions only.
2. Attempt **FIVE** out of **SIX** questions. All questions carry equal marks and the distribution of marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.

**Question 1 [10Marks]**

- (a) TCP/IP addressing system has different scheme at data link, network and transport layer. Discuss.

[3 Marks]

- (b) Figure 1 shows an output of TCP/IP addressing using ifconfig tool.

```
ibrahim@iuserver:~  
ibrahim@iuserver:~$ ifconfig eth0  
eth0      Link encap:Ethernet  HWaddr 00:16:35:78:3d:87  
          inet addr:10.0.88.48  Bcast:10.0.88.63  Mask:255.255.255.192  
          inet6 addr: 2001:e68:3001:580:216:35ff:fe78:3d87/64 Scope:Global  
          inet6 addr: 2001:e68:3001:580:45f3:2bc5:35b2:2315/64 Scope:Global  
          inet6 addr: fe80::216:35ff:fe78:3d87/64 Scope:Link  
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
          RX packets:60248 errors:0 dropped:0 overruns:0 frame:0  
          TX packets:29250 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0 txqueuelen:1000  
          RX bytes:59599826 (59.5 MB)  TX bytes:6114439 (6.1 MB)  
          Interrupt:17
```

Figure 1: TCP/IP Addressing using ifconfig tool

- i. Identify the MAC address  
[1 Mark]
  - ii. Identify IPv4 address  
[1 Mark]
  - iii. Identify the IPv6 address  
[1 Mark]
  - iv. Give the tools or command in Windows operating system that produce similar result  
[1 Mark]
- (c) Describe THREE (3) important services in TCP/IP Protocols Stack.  
[3 Marks]

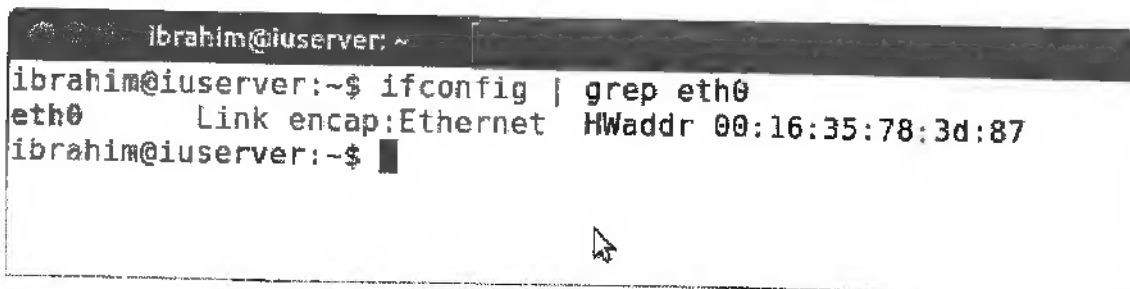
Continued ...

**Question 2 [10 Marks]**

- (a) Differentiate between program and process based on UNIX basic definition. [4 Marks]
- (b) Briefly discuss fork system call. [2 Marks]
- (c) Write full C program to get IP address of an interface on Linux. [4 Marks]

**Question 3 [10 Marks]**

- (a) A signal is a notification to a process that an event has occurred. Discuss THREE (3) methods of signal handling. [3 Marks]
- (b) What is Inter-Process Communication (IPC) and list FOUR (4) reasons for IPC. [5 Marks]
- (c) Briefly describe a pipes that available in IPC. Write a pipe command that produces an output as below.



```
ibrahim@iuserver: ~  
ibrahim@iuserver:~$ ifconfig | grep eth0  
eth0      Link encap:Ethernet  HWaddr 00:16:35:78:3d:87  
ibrahim@iuserver:~$
```

[2 Marks]

**Continued ...**

**Question 4 [10 Marks]**

- (a) Given the following code snippet:

```
key_t    mykey;
mykey = ftok("/tmp/myapp", 1);
```

Describe the process carried out by the `ftok()` function.

[2 marks]

- (b) List TWO (2) ways in which messages can be obtained from the queue in message queue system.

[2 Marks]

- (c) Describe the operations involved in Semaphore inter-process communication.

[6 Marks]

**Question 5 [10 Marks]**

- (a) In TCP connection, how TCP/IP program identifies the end connections to which the packets to be delivered?

[2 Marks]

- (b) Complete the following code by writing the `bind()` function for the TCP socket connection.

```
int main( int argc, char *argv[] ) {
    int sockfd, newsockfd, portno, clien;
    char buffer[256];
    struct sockaddr_in serv_addr, cli_addr;
    int  n;

    /* First call to socket() function */
    sockfd = socket(AF_INET, SOCK_STREAM, 0);

    if (sockfd < 0) {
        perror("ERROR opening socket");
        exit(1);
    }

    /* Initialize socket structure */
    bzero((char *) &serv_addr, sizeof(serv_addr));
    portno = 5001;

    serv_addr.sin_family = AF_INET;
    serv_addr.sin_addr.s_addr = INADDR_ANY;
    serv_addr.sin_port = htons(portno);

    /* Write your code using bind() call.*/

}
```

[3 Marks]

**Continued ...**

- (c) Complete the following code to retrieve and display the client's IP address in the form of dotted decimal using the `inet_ntoa()` function.

```
Listen(sockfd, 5);  
clilen = sizeof(cli_addr);  
new_sockfd = accept (sockfd, (struct sockaddr *)&cli_addr,  
&clilen);
```

```
/*Write the inet_ntoa() function here*/
```

[2 Marks]

- (d) What is the function of `gethostbyname()`. List the input and output of this function.

[3 Marks]

### Question 6 [10 Marks]

- (a) Describe the functions of `select()` system call in I/O multiplexing?  
[2 Marks]
- (b) Discuss **TWO (2)** changes in `pselect()` that differentiates it from `select()` system call in I/O multiplexing.  
[4 Marks]
- (c) Why does Remote Procedure Call (RPC) only implements pass-by-value for parameter passing? Explain your answer.  
[2 Marks]
- (d) Explain the incompatibility problems for data representation in RPC.  
[2 Marks]

**End of Page**